

# Variable-Fidelity Conceptual Design System for Advanced Unconventional Air Vehicles, Phase I

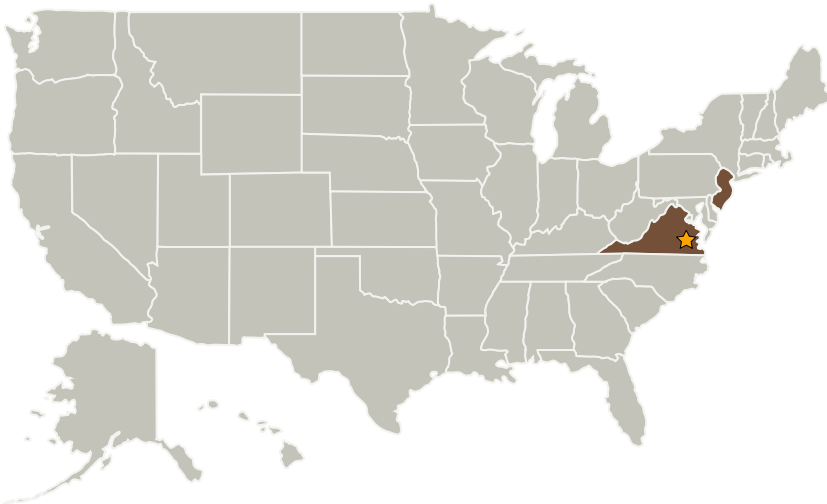
Completed Technology Project (2009 - 2009)



## Project Introduction

Ongoing work in unconventional air-vehicles, i.e. deformable mold-lines and bio-mimetics, is beginning to provide the insight necessary to exploit performance benefits associated with unsteady flow phenomena. However, the current generation of conceptual design/analysis tools, based on empirical and heuristic models, is incapable of analyzing advanced concepts with confidence, and a new approach, which exploits recent and ongoing developments in unsteady aeromechanics, is needed. The proposed effort addresses these shortcomings by developing a hierarchical system of validated variable-fidelity physics-based aeromechanical tools for designing, analyzing and evaluating advanced concepts that employ aerodynamic shape change and other unsteady phenomena. This suite of state-of-the-art tools will be integrated as a design and analysis system which can rapidly and reliably perform "virtual expeditions" through the design space. In addition, validated subcomponents, ranging from real-time free-wake analyses and fully-coupled non-linear fluid-structure interaction tools to highly efficient CFD solvers with automated grid generation, will be made available as retrofittable modules for current tools. The capability to design and evaluate advanced concepts offered by this system directly addresses the long-term aircraft systems development goals of prospective users in both government and industry. The software will achieve TRL=4 during Phase I and TRL=7-8 by the end of Phase II.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Langley Research Center (LaRC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Continuum Dynamics, Inc.	Supporting Organization	Industry	Ewing, New Jersey

## Primary U.S. Work Locations

New Jersey	Virginia
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX15 Flight Vehicle Systems
  - └ TX15.1 Aerosciences
    - └ TX15.1.3 Aeroelasticity